STATE OF COLORADO

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

March 20, 2014

Mr. Anthony Brown
Atlantic Richfield Company
4 Centerpointe Drive 4-435
La Palma, CA 90623

Re: Technical Comments #1
Application for Certificate of Designation
Solids Repository near Rico, Colorado
SW / DOL ARC / 2.1

Dear Mr. Brown:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division, Solid Waste and Materials Management Program (Division) received an Application for a Certificate of Designation / Solids Repository Engineering Design and Operations Plan (Application)" pertaining to the Rico-Argentine Mine Site – Rico Tunnels Operable Unit OU-01 (OU-01). The document dated January 2014 was prepared and submitted by AECOM on behalf of Atlantic Richfield Company (Atlantic Richfield). The Division received a request to commence review of the Application from Dolores County (County) on February 11, 2014.

The Application was reviewed to determine its compliance with the requirements set forth in the Solid Waste Disposal Sites and Facilities Act, Title 30, Article 20, Parts 1 and10 of the Colorado Revised Statutes, as amended, and with the regulations promulgated there under 6 CCR 1007-2 (Regulations). The Division conducted the completeness review, determined the Application to be ***complete*** and provided correspondence dated March 6, 2014. In accordance with the solid waste statute C.R.S., 30-20-103 (2) a "technical evaluation" of the Application has been initiated. The Division provides the following technical comments for your consideration. The Section and/or Page number is provided for general reference.

Main Text

1. Section 1.1 – Provide more information on the current EPA project regarding the expected time-frame and activities/operations that may involve the EPA in the future.
2. Section 1.2 - The CD boundary is a key area to clearly and accurately present as all activities within the boundary may be subject to Division and County review and approval. In appropriate text sections and on appropriate figures and drawings please present the proposed CD boundary (and acreage). When drawing the boundary consider property ownership, any/all potential future activities associated with waste treatment (drying facility), storage and disposal, groundwater monitoring, site access and other local land use issues. Also explain the current land ownership situation.

3. Section 2.3 – The Division believes that the site is within a seismic impact zone (an area with 10% or greater probability that the maximum horizontal acceleration in lithified earth will exceed 0.10G in 250 years). Revise accordingly.
4. Section 2.5 – Please provide some data or information on the typical / average wind conditions and predominant directions.
5. Section 3.0 – In this or another section please provide the climate information for the site.
6. Section 3.1 Geologic Hazards – Please append a map that indicates the known old landslide area with respect to the proposed site, the mine, the existing lead repository and the historical borrow area.
7. Section 3.1 Faulting and Seismicity – In paragraph 2 the reference to "Section 11.0" may require revision. Provide technical defense for the use of the horizontal peak ground acceleration (HPGA) with a probability of 10% in 50 years for the modeling. The HPGA with a probability of 10% in 250 years may be used or it may be adjusted for site specific soil/sub-grade conditions.
8. Section 3.2 Hydrology – In paragraph 3, revise "west" to "east". Include a description of the existing groundwater quality in the vicinity of (and beneath) the proposed facility. Consider using existing groundwater data to identify current groundwater quality conditions. This information may be useful as a baseline condition and in a request for a waiver from groundwater monitoring as discussed in Section 4.9 technical comments. One commercial water well is identified on Figure 6. Please provide additional information on the well use. Page 3-6 indicates the SAP is being updated. Consider if the SAP submitted is appropriate for this EDOP (see comment for Appendix D and E and revise accordingly). Note that the various plans placed in the EDOP would be enforceable by CDPHE if the CD is approved, even though they are most applicable to the current EPA OU-1 project.
9. Section 3.5 Field Exploration Results - Include a current piezometric surface map and revised description of the gradients accordingly. Explain any differences in gradient across the area (0.02 and 0.6 ft/ft).
10. Section 3.6.1 – Provide compaction specification for starter dike and lift thickness that would be consistent with the stability analyses and results with an adequate factor of safety.
11. Section 4.1 – This section describes material management and requires additional specifics for any and all material/waste excavated, moved, stored or re-used during this project. Describe where the excavated pond solids (from the IDF) would be temporarily stored and managed during landfill construction . In addition describe the plan for management of the calcines and for the native materials excavated during construction. Provide location of the use areas including the "Upper North Area". Explain regulatory authority for materials/waste that are placed, stored or otherwise used outside of the CD footprint.
12. Section 4.2 – Clarify that the facility is proposed for the specific wastes listed (5 bullets) and that disposal of any other waste will require approval from CDPHE and the County. Explain that any wastes placed into the landfill will be compatible with the previously disposed waste(s) and with the HDPE liner material. In addition explain that the waste will not be a hazardous waste and will be a solid waste by definition.
13. Section 4.3 – Revise "exiting" to "existing" for the 6 bullets on Page 4-3. Last paragraph – provide additional explanation of the need, design details and specifications for the intermittent geogrid reinforcement for global stability. Explain this added operation is due to potential stability issues when waste is in the un-drained state.
14. Section 4.5.1 –Provide additional discussion on the different possible sub-grade materials (calcines, waste rock, colluvium and alluvium) and their potential differential deformation considering the landfill waste loading. The sub-grade settlement across the landfill needs to be very much the same in order to maintain liner integrity after loading. Explain how the "design incorporates local ground movement in the design". Provide specifications on each sub-grade material, lift thickness and construction compaction density and moisture content. Provide sub-grade "foundation" material specification for directly beneath the landfill base liner and state that no waste in the subgrade will be in direct contact with the HDPE liner material. In the CQA Plan include this as one criteria for acceptance of the "foundation" layer prior to installing HDPE.
15. Section 4.5.4 – Provide material specifications for filter layer and material and permeability specification for the leachate collection system (LCS) drainage layer. Explain the "filter diaphragm" presented on Sheet 14 and the use of sand and provide a design for the man-hole.

16. Section 4.6.3 – The stability modeling inputs and results require clarification and additional review. Clarify if the cross-sections modeled were for Phase 1 or for Build-out. The elevations match Build-out but the distances are more similar to Phase 1. Paragraph 3 provides a lot of information and results that may be best expanded in a technical memorandum with the appended stability analyses. The values used in the modeling should be defended, possibly referencing Section 3.6, as well as the pseudo-static earthquake load and design seismic event ground acceleration, as mentioned above in the Section 3.1 comment. The geotechnical character of any waste placed into the landfill must be consistent with the properties assumed in the stability analyses that provide adequate factor of safety. Clearly describe the specifications for the waste such as moisture content, shear, undrained strength, etc. Include the geotechnical testing needed to document material properties in the waste characterization plan.
17. Section 4.7 – Review and revise the paragraph 3 appropriately for catchment basin and ditch base width. Reference is made to the stormwater management plan (SWMP) in Appendix H. Consider leaving this document out of the EDOP if it is already outdated, as mentioned in our meeting. Any of the BMPs and other site management items could be incorporated into Section 4.7.
18. Section 4.8 Drying Facility Reconfiguration – We discussed the regulatory authority of a drying facility in the future. I believe the waste taken from the ponds would be considered a "sludge" and by definition would be under solid waste program authority. Therefore a future drying area should be located inside the CD boundary and a design and operations included in the EDOP. Depending on the design, a drying facility for the water treatment "residuals" might be considered a "waste impoundment" in the Regulations: "a natural topographic depression, excavation, pit, pond lagoon, trench or diked area ..... which may be lined with earthen material or synthetic material, is designed for storage, treatment or final disposal of solid waste". If the drying facility design is considered a waste impoundment, Section 9 of the Regulations may apply. A general design for the drying facility could be included in the EDOP and it could be revised for construction at a later time as warranted by site development. We also discussed drying of the waste within the landfill lined area as an option.
19. Section 4.9 Groundwater Monitoring – Essentially Atlantic Richfield is requesting a waiver from groundwater monitoring. See comment 23 related to waiver requests. The Division understands that the current groundwater monitoring schedule is finite and EPA requirements for long-term monitoring are not anticipated. Therefore, consider that the appended Sampling and Analysis Plan (SAP) and the Quality Assurance Project Plan (QAPP) may not be appropriate for inclusion in this EDOP in their current state and particularly if a waiver is to be approved. Additional comments on the SAP and QAPP are provided below in the Appendices comments.
20. Section 4.9 - The existing groundwater quality indicates impacts from historical site operations. Based on the limited groundwater and waste characterization data provided in the EDOP, arsenic, lead and pH exceed the Basic Standard for Groundwater in Colorado (BSGW) in more than one well. Concentrations for many analytes were very high in well MW-5S suggesting calcines, in certain areas of the site, could impact groundwater quality. Comparison of the waste characterization TCLP data to the BSGW indicates every metal tested could leach at concentrations exceeding the standard (in at least 2 samples). Therefore if leachate leaked from the landfill it could negatively impact groundwater quality in addition to any currently identified impacts. The Division understands that several aspects of the site operations (future water treatment, waste drying, landfill build out) remain undetermined at this time. Construction of any of these facilities will likely involve excavation of existing wastes, temporary storage, etc. any of which likely could affect groundwater quality. Therefore initiating a groundwater monitoring program specifically for the landfill at this juncture doesn't seem practical. Based on current understanding the Division makes the following suggestion. In the EDOP commit to establish existing groundwater quality conditions using the many wells and existing data at the site under a schedule (say 12 months). Appendix B of the Regulations provides analytical list for groundwater monitoring. Consider testing groundwater for the Appendix 1A and 1B list at least twice (for baseline) in several key wells if current analytical testing is more limited. Request a waiver from groundwater monitoring for a time frame that allows for the future operations at the site to be determined (for final) and constructed. Note that in the future if a waste to be placed into the landfill is determined to be more toxic than what is currently understood, based on waste characterization,

then it is feasible that the waiver could be withdrawn. In the text add a statement that any waiver from groundwater monitoring will be requested every 5 years in accordance with Section B1 of Appendix B of the Regulations.

21. Section 4.9 is a good place to explain the entire system (waste character, site condition, liner design): the potential for the facility to negatively impact groundwater or surface water quality; other potential sources of contaminants around the vicinity; the baseline conditions determined by existing data; and then reference the waiver request. Waste characterization is discussed in the comment for Section 5.3 but it is important to understand that we consider the entire system when considering a request for a waiver from groundwater monitoring.
22. Section 4.10 – For landfill gas monitoring, identify that a waiver request from Section 2.1 of the Regulation is appended. Explain that if any waste to be disposed in the future has the potential to generate gas, such as methane, the waiver request will require renewal based on the new information.
23. A formal request for a waiver from Sections 2.1 (landfill gas monitoring), 2.2 (groundwater monitoring), 3.3.4 for daily cover and 3.5.2 (Closure slope standards) should be prepared and placed into an appendix specifically for waiver requests. All waiver requests should include information as noted in Section 1.5 of the Regulations.
24. Section 5.2 – In Section 3.6 there are several descriptions that identify the sensitivity of solids (for stability) in an un-drained condition relative to material management. Please provide a description of this operation to accommodate drainage and reinforcement of certain waste.
25. Section 5.2 Intermediate Cover Material Requirements – Provide a specific location where borrow material will be stored that is on land owned by Atlantic Richfield and state that the material will be dedicated to the landfill for use as intermediate and final cover.
26. Section 5.3 Waste Characterization Plan – Considering the specific waste(s) to be disposed in the landfill are somewhat undefined and therefore not characterized, please revise the plan providing a testing frequency and analytical list for the priority waste (current water treatment pond solids) that will assure that waste does not have characteristics of a hazardous waste and that other chemicals/metals of concern do not exceed the hazardous waste criteria. The testing schedule could be on a volume basis (such as one per 1,000 cy initially and then one per 5,000 cy thereafter composited from the drying area. Also a sample should be tested if the water treatment process changes or the physical/chemical condition of the waste change. Waste characterization should also identify that the waste character has not changed significantly from the approved waste and that the documentation will retained in the Operating Record. Provide analytical testing list and testing rate to be conducted on other specific wastes such as calcines, waste rock and future wetlands treatment waste and then state the testing may be revised when additional information on the waste is available. Include radionuclides such as radium 226+228, total uranium and total thorium a minimum of one test per specific waste type. Add geotechnical tests to the waste characterization to assure stability of the landfill as modeled.
27. Section 5.4 – Regarding nuisance dust conditions, the "temporary cover" should be identified as soil or an alternative cover that will be recommended for review and approval by the Division. Discuss the potential for a leachate discharge pipe to freeze and provide a contingency plan that will minimize back-up of leachate within the landfill seasonally. Consider other operational activities that could be impacted by weather or waste conditions that could become a nuisance then provide a contingency plan for that situation.
28. Section 5.5 – In bullet 3 add "CQA / CQC report" to the as-built documentation. Bullet 8 – Delete the part describing notifications to the governing authorities regarding changes to the SAP. Also add bullets to retain a groundwater monitoring plan and a copy of CD in the records. Along with the deed notation, Atlantic Richfield must develop institutional controls through an environmental covenant for the site in accordance with the solid waste act CRS 25-15.
29. Section 6.3 – Revise the text to clearly state that a waiver from Section 3.5.2 in the Regulations is being requested and then reference the appended the waiver request. Provide specifications for the following: sub-liner material specification, drainage layer material and permeability specifications and vegetation seed mixture. Provide technical support for the long term viability and performance for the 6 inch top soil layer.

Stability analyses for the final cover system are warranted given the extremely wet conditions that occur during snow melt. See Appendix G comments.

30. Section 6.4 – Add text that explains that temporary stormwater controls will be designed and constructed for the 25-year 24-hour storm event or larger and will be reviewed and approved by the Division prior to construction.

Tables and Figures

31. Table 4 – Add the BSGW for Human Health Standards (WQCD Regulation 41 Table 1) to the table for comparison with the dissolved metals.
32. Table 7 Waste Characterization Data – Consider adding the RCRA hazardous waste thresholds (TCLP) and the BSGW for Human Health Standards (Regulation 41 Table 1) to the Table 7.
33. Figures and Sheet Drawings – The CD boundary as well as other lines must be clearly defined to minimize potential confusion. For example, the Phase 1 and Build-out boundaries presented on many of the figures and sheets are the areas of disturbance which may easily be confused with a landfill boundary or a waste/liner edge. Consider adding the CD boundary to Figures 1 – 4 and clarifying the lines shown as disturbance boundaries. Consider adding the CD boundary to Sheets 1-4 and identify the disturbance boundary (Sheets 3-12).

Appendix A – Sheet Drawings

34. Sheets 10 – 12 and 15 – Please add the HDPE liner edge (anchor trench).
35. Sheet 12 – Present the complete flow path for the stormwater ditches into existing control features.
36. Sheet 13 – Provide detail for the HDPE cover-to-liner tie point or overlap. For the liner system leachate gravel drainage layer, consider that it should not extend to the top of the cell side slope.
37. Sheet 15 – Identify the edge of the final cover. This is an important boundary and could be used on other drawings as the cell/landfill footprint boundary. Please provide a closure grading plan for Phase 1 because the build-out option may not become reality. This will provide information useful for financial assurance. Please check the final cell closure elevation considering a 3:1 slope from the perimeter berm and revise accordingly. For the final cover, provide the stormwater controls for flow from the cover and from the drainage layer located near the toe of final closure slope. Present the location of the cross section(s) for the stability analyses.

Appendices

38. Appendix D SAP and Appendix E QAPP – The SAP and QAPP include a lot of information that is not relative or necessary for the solid waste landfill EDOP. Consider modifying the documents to include only the groundwater monitoring protocol, such as sampling, sample management, analytical laboratory testing, reporting of results and QA/QC and then explain that the protocol was used for groundwater samples collected for the EPA OU-1 from 20XX through 201X. Alternatively, eliminate the SAP and the QAPP from this EDOP and provide a more relevant plan when/if groundwater monitoring is required. The document control statement in the QAPP may indicate the document should not be utilized for a solid waste CD facility.
39. Appendix G - Provide a description of each of the calculations, methods and assumptions possibly in a memorandum format. This will aid in understanding and review of the Drainage Layer Filter Design and the Stability Analyses. Additional comments on the stability analyses were provided above for Sections 3.1 and 4.6.3. For the stormwater design, provide a map of the stormwater drainage basin that sources the water for the ditch design. The run-on control ditches must tie into existing ground elevations and water control features with appropriate erosion control as needed. Provide any stormwater control designs associated with the relocated access road (Sheet 12 and 15) if it is within the CD boundary. Explain the information on the tables including the "entire catchment", "west of FS road" and "(worst case)".
40. Appendix H – The Stormwater Management Plan (SMP) was prepared for the wetland construction project under EPA. Although some of the document may be applicable to the proposed facility, submitting this document may cause confusion. Consider revising the SMP specifically for the proposed project or eliminating it from the EDOP. The EDOP could state that a SMP will be prepared in the future when/if it is determined that it is required by WQCD possibly as part of a future discharge permit. Solid waste

regulations require design, construction and maintenance for specific storm events for stormwater control systems.

41. Appendix I CQA Plan – Throughout the plan, replace "EPA" with "CDPHE" as appropriate (or add to EPA). This plan must be specific to the solid waste facility. Section 4.3 – Consider adding a reference to Table 1 - Summary of Construction QA/QC Testing. Section 5.8.4 – Add construction photographs, all field/laboratory testing results/reports (identify each specifically), manufacturer quality assurance data and warranties and acceptances (sub-grade and final liner installation). Table 1 – Consider adding additional Proctor testing, such as one test per 6540 cy, given that the sub-grade material could vary substantially, and testing drain rock for carbonate (ASTM D4373) and permeability at one test per 2500 cy. The Division has a Guidance document for construction quality assurance available on our web-site.

Please provide revisions to the proposed D&O and a cover letter responding to the comments identified above. Replacement pages (with instructions) are one option to reproducing these large documents. Explain any major reorganization of the document and identify where (in the document) the Division can review the changes relative to a certain technical comment. Redline versions can also make the next review more efficient. The Division may request additional information in order to clarify aspects of the proposal before completing the technical evaluation. The Division will likely initiate a 30-day written public comment period following public notice when the next revision is received.

In closing, the Division is authorized to bill $125/hr for review of technical submittals pursuant to Section 1.7 of the Regulations. The fee ceiling is $35,000 for review of the Application, which can include time for the completeness review, the technical review and for associated meetings and other communications. An invoice for the Division review of the document will be transmitted to you under separate cover. Please contact Robert Peterson at 970-248-7151 if you have questions regarding this correspondence.

Sincerely,

Robert J Peterson

Robert Peterson, Environmental Protection Specialist
Solid Waste and Materials Management Program
Hazardous Materials and Waste Management Division

cc: E. Williams, Dolores County BOCC
GJ file
ec: T. Kreutz, AECOM
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